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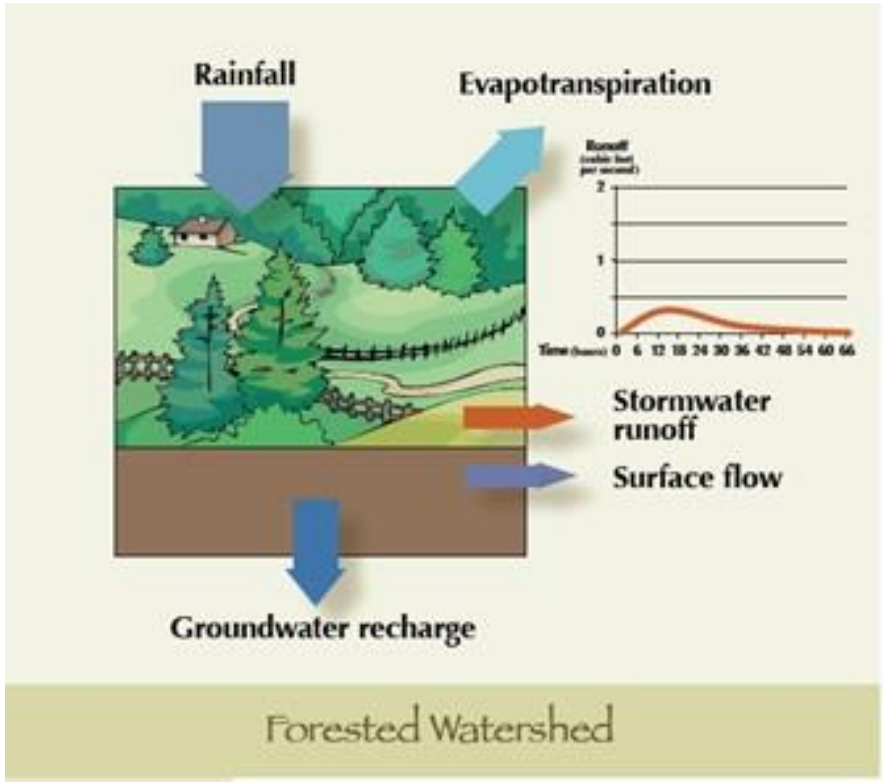
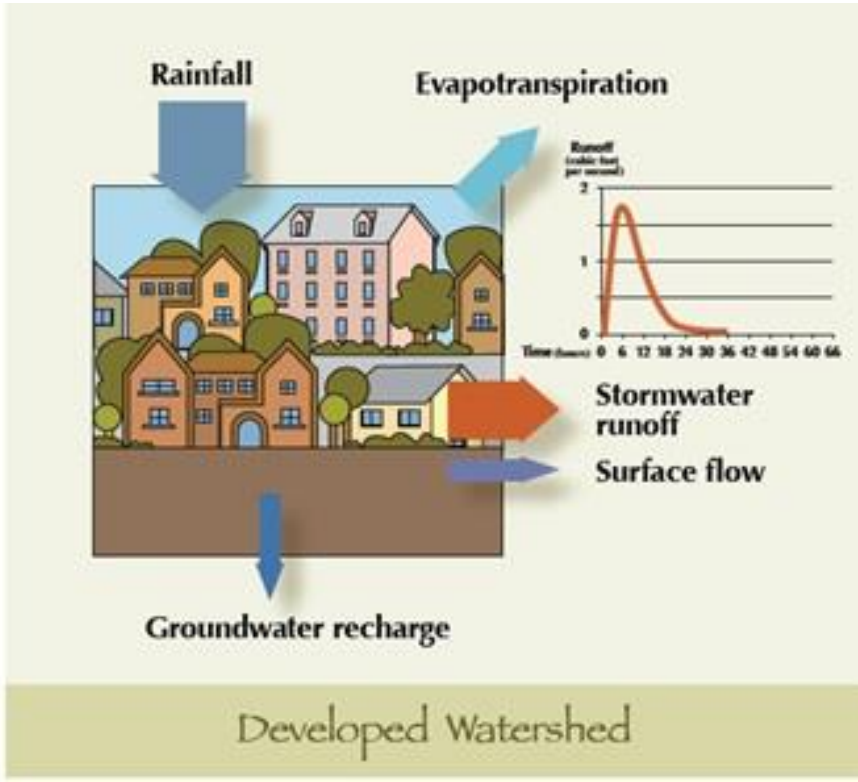
Water Quality Monitoring Plan for engineered stormwater structures

Vijay Vulava, PhD





Coastal development increasing

Stormwater ponds “compensate” lost natural buffer

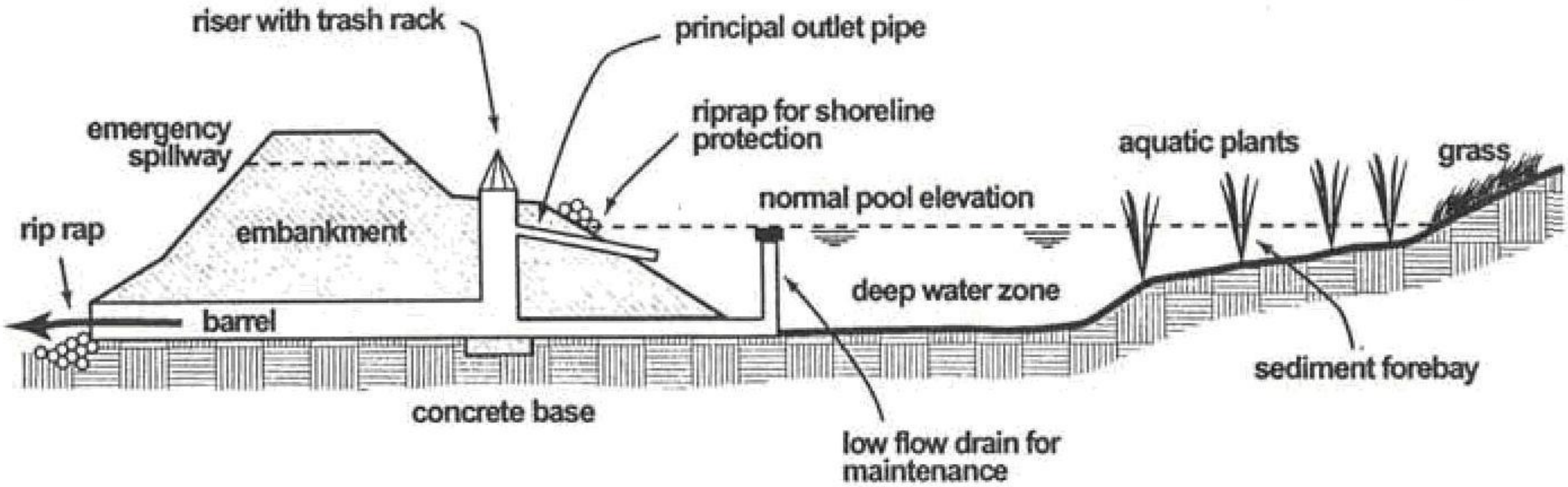
Residential ponds

Aesthetic value

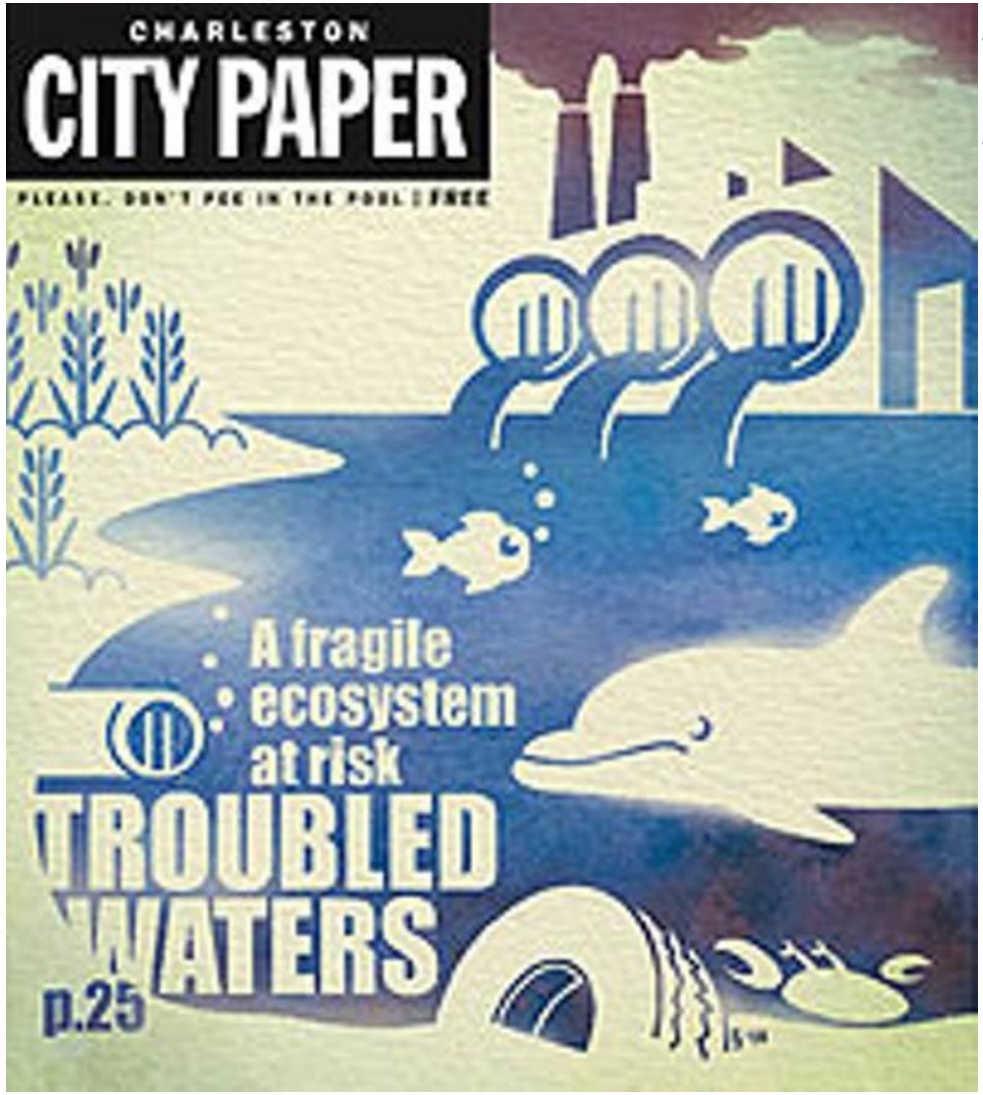
Other benefits not obvious

Industrial-scale ponds

Rapid urbanization



Design specifications – from water quantity perspective



CHARLESTON
CITY PAPER

Win
The South

FOOD+DRINK MUSIC+CLUBS

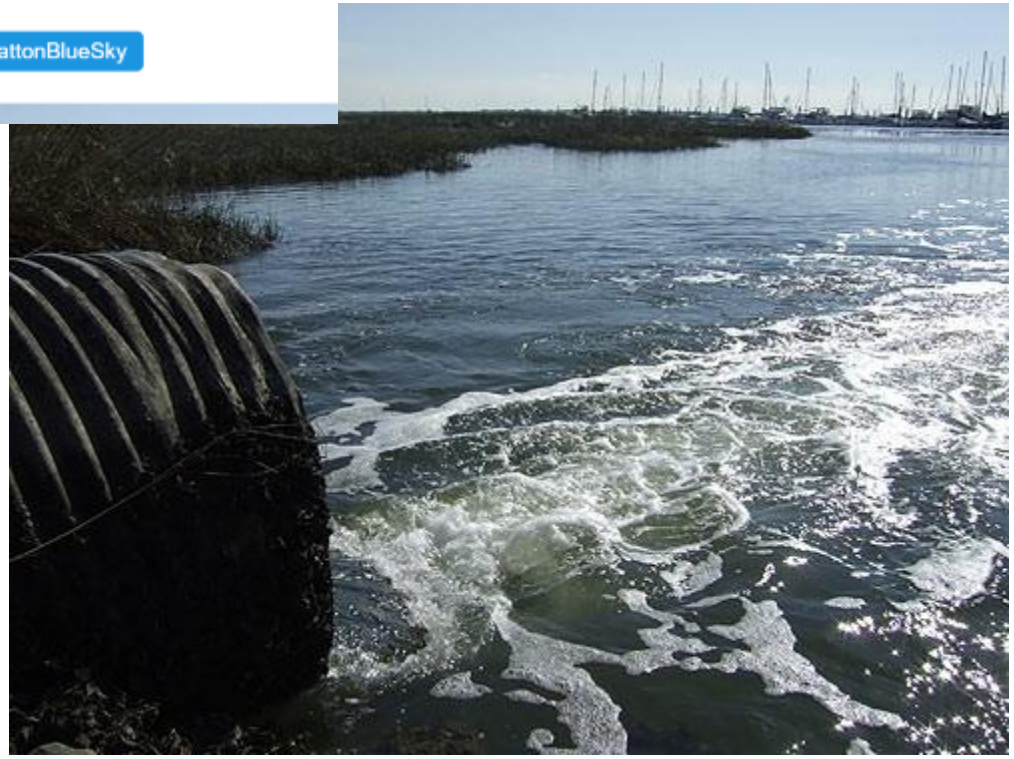
NEWS+OPINION » COVER STORY

Water, Water Everywhere

But is it so fresh and so clean?

By Stratton Lawrence Follow @StrattonBlueSky

Is water still clean?



Are ponds functioning as designed?

What's discharging into these ponds?

IDENTIFY YOUR NEEDS:

Aesthetic?

Ecological?

Economic?

Property value?

CLASSIFY NEEDS:

1. Water quantity

2. Water quality

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Stormwater is key

WATER QUANTITY PERSPECTIVE:

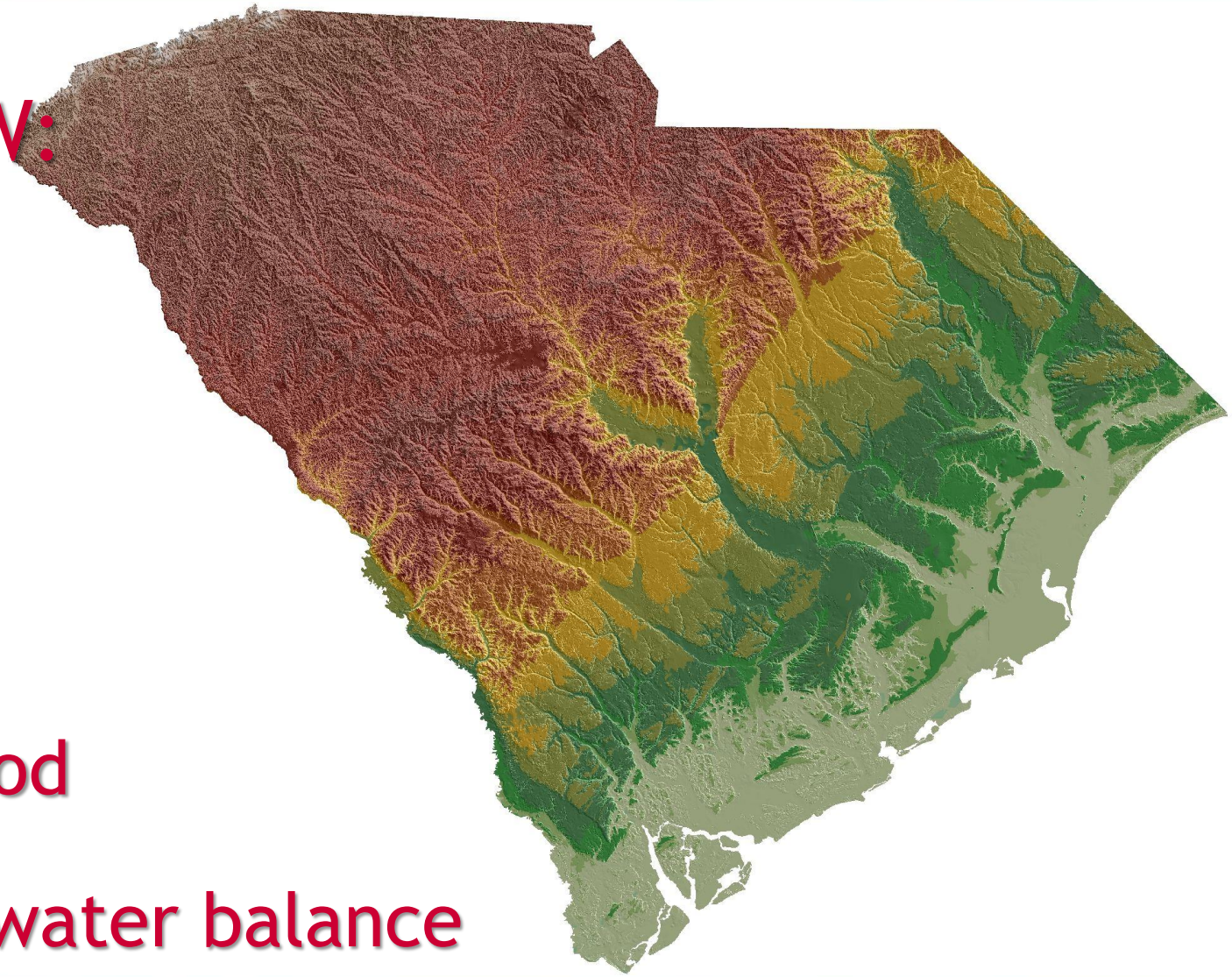
WATER BALANCE & FLOW:

High precipitation

Flat topography & shallow WT

GW/SW interactions inadequately understood

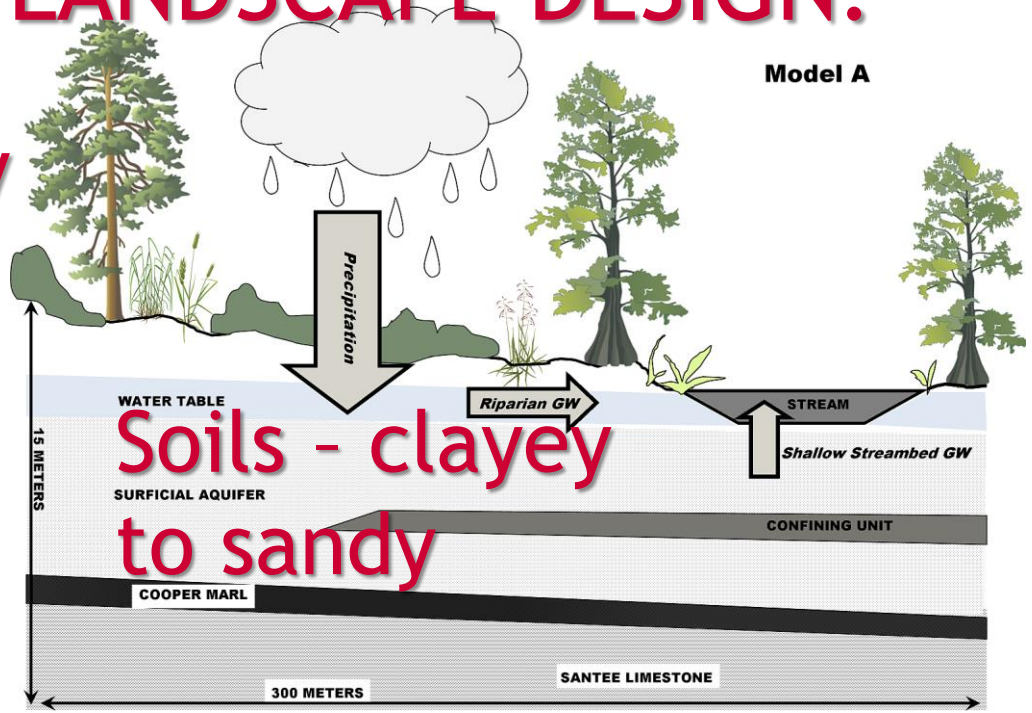
Urbanization modifying water balance



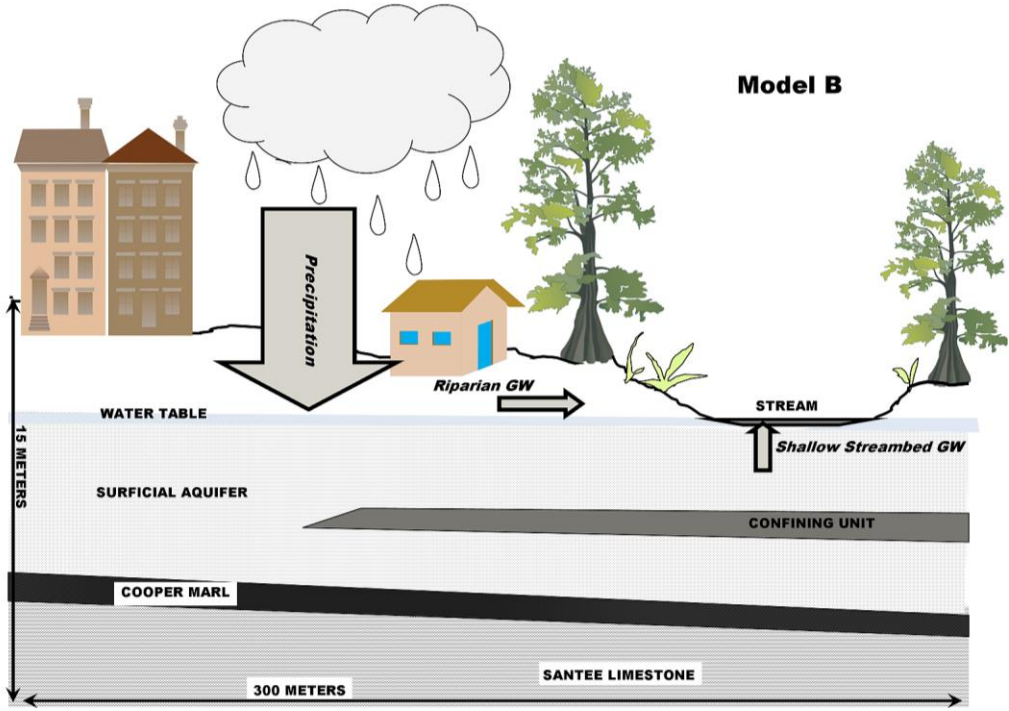
POND & LANDSCAPE DESIGN:

Wet vs. Dry

Vegetative buffers



Soils – clayey to sandy



Loss of storage volume

Engineering design specific to low country

WATER QUALITY PERSPECTIVE:

NATURE OF SURFACE RUNOFF:

Sediment

Inorganic chemicals

Organic chemicals

Pathogens

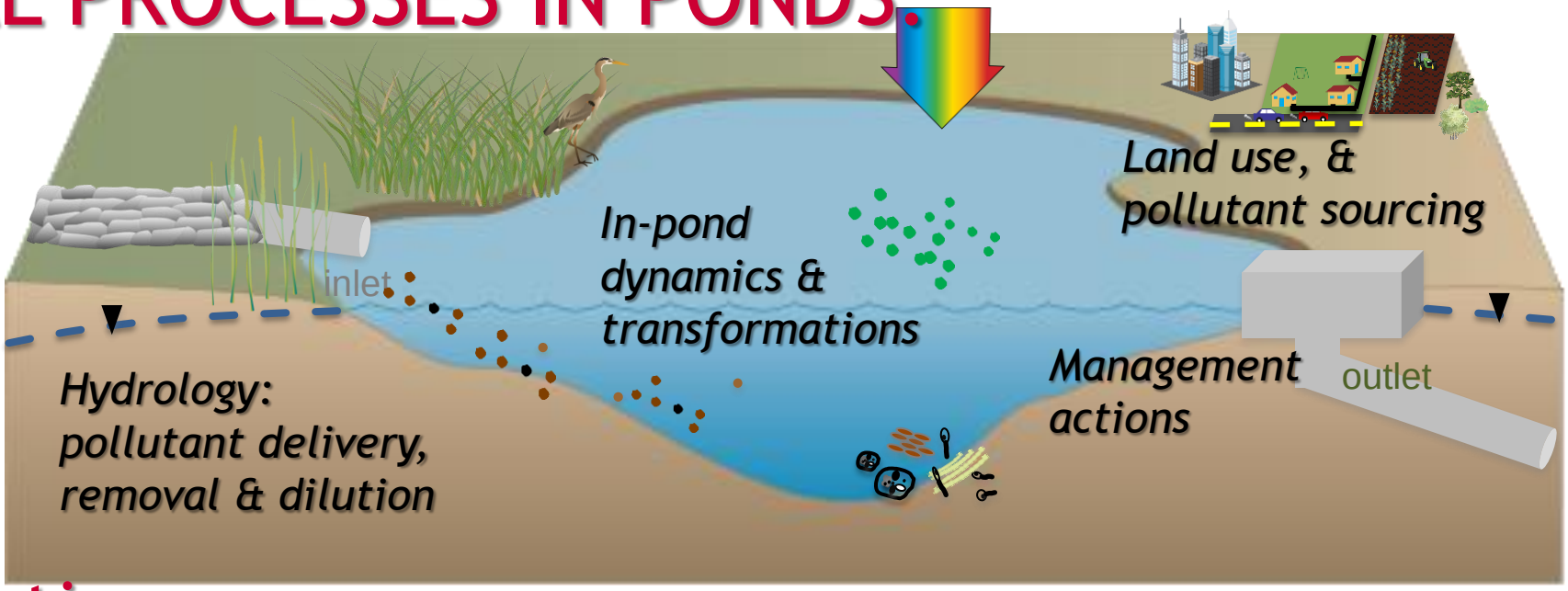
BIOGEOCHEMICAL PROCESSES IN PONDS:

Sorption

Biological

Chemical transformations

Sediment-facilitated transport



Conceptual diagram of chemical, physical, & biological processes

Pond design & management

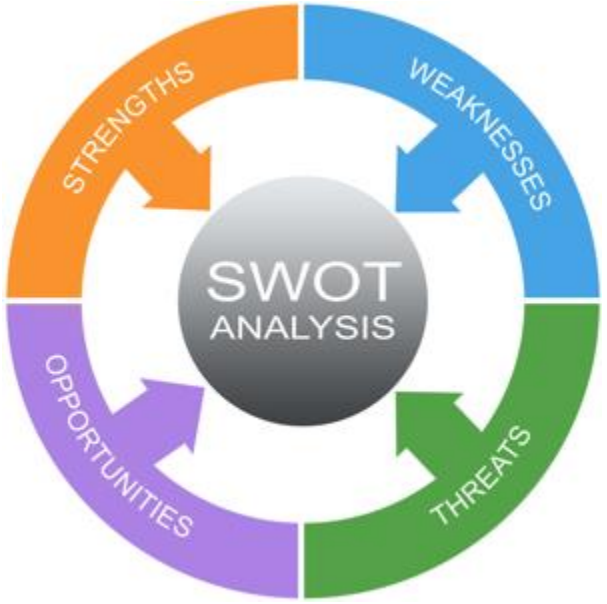
SUMMARY:

Flow & contaminant behavior is complex

Optimally designed & managed ponds can reduce contamination

Existing science & engineering knowledge offers solutions

RECOMMENDATIONS:



Identify stakeholder priorities

Focus on both symptoms & solutions

Establish a simple education & monitoring program

Long-term commitment

RECOMMENDATIONS FOR WQ PARAMATERS:

Data collection – community } Monthly, event-based?

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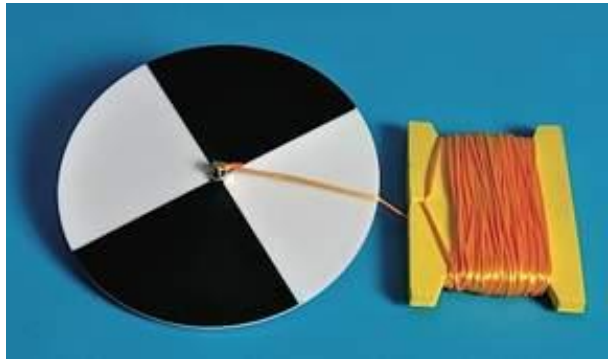

Water T, turbidity, dissolved O_2, TDS, pH – community?

} Monthly, event-based?

RECOMMENDATIONS FOR WQ PARAMATERS:

N, P, bacteria, trace metals
- certified labs

} Seasonally or annually?

QUESTIONS?